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Gas Journal

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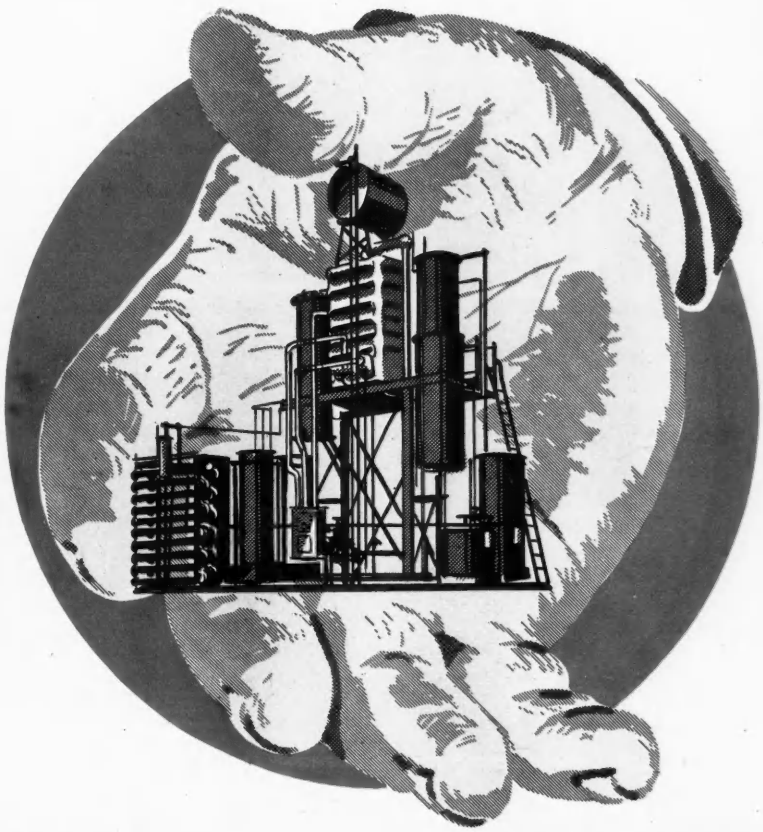
BENZOLE and TOLUOLE PLANT



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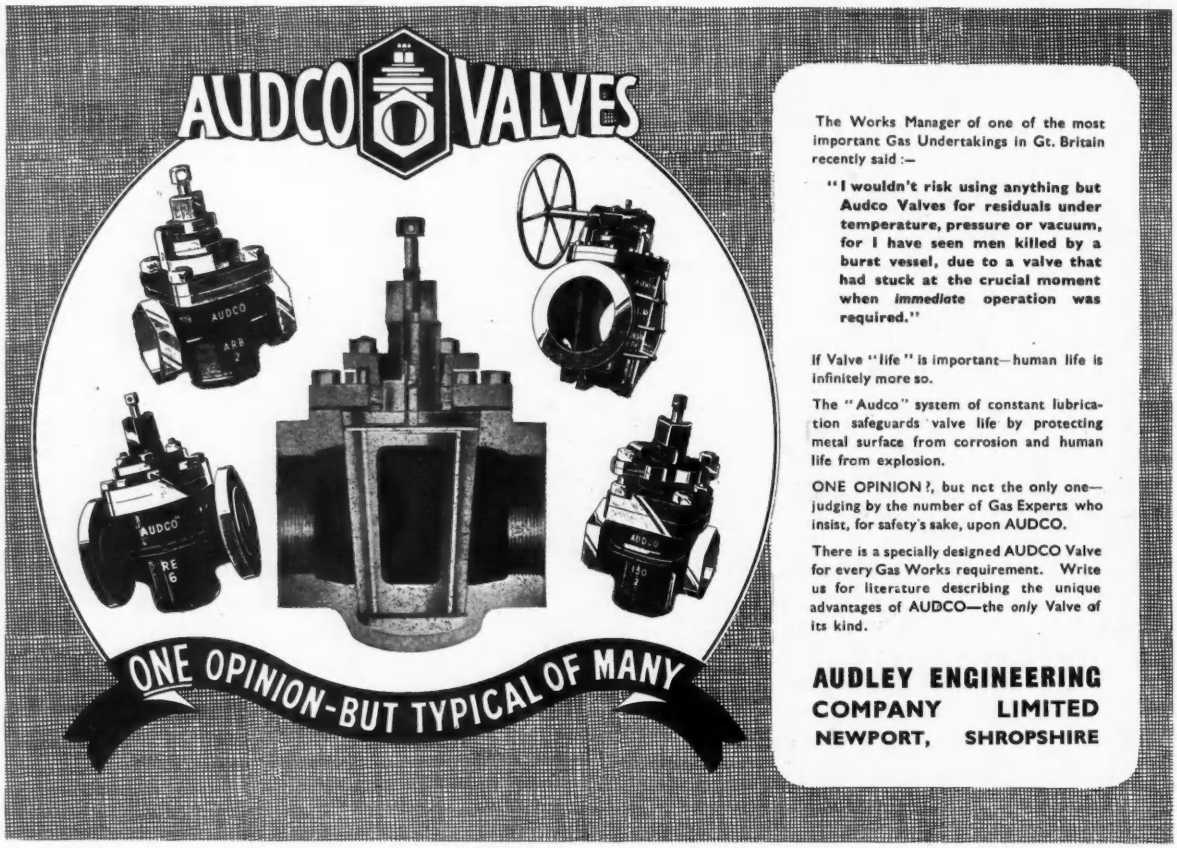

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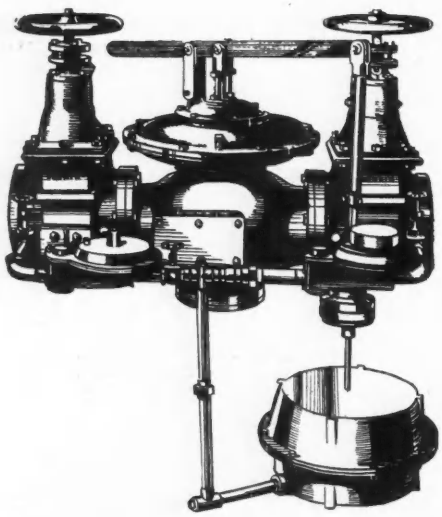

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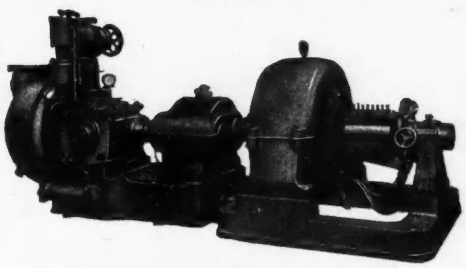

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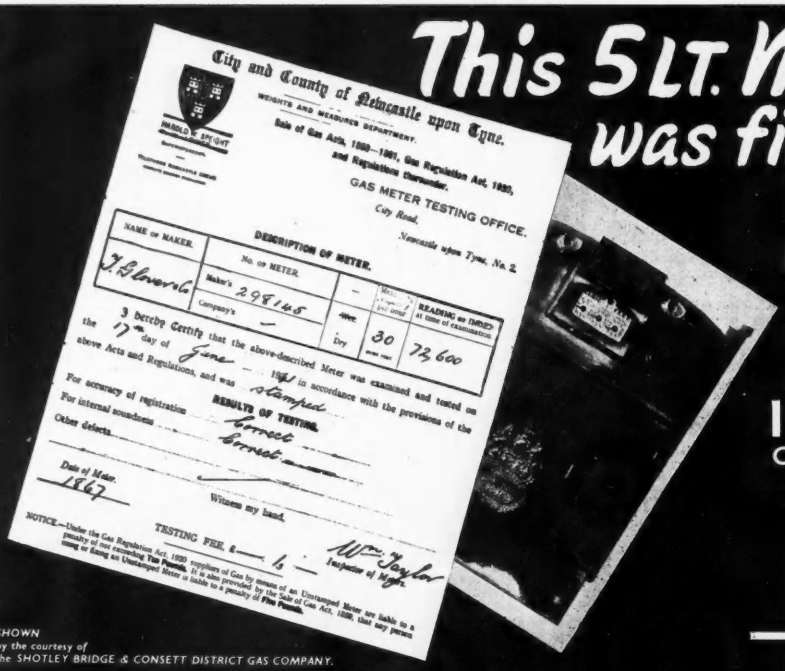
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Company's —
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30
73,600
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For accuracy of registration Correct
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Other defects —
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TESTING FEE, 6 — 1 — 6
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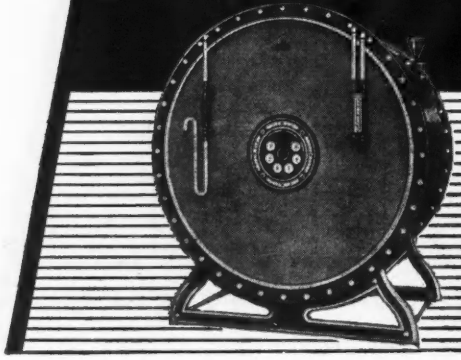

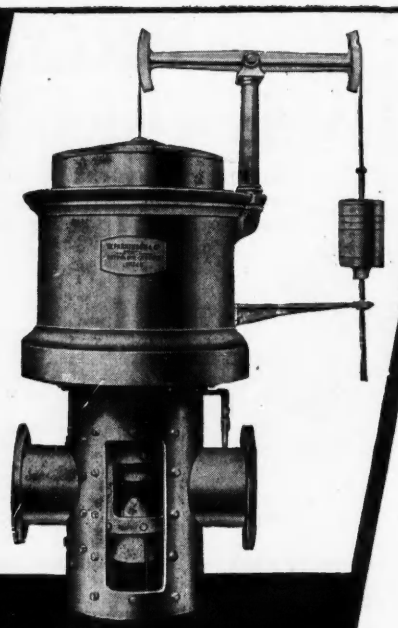

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GAS JOURNAL, NOV. 12, 1941

VOL. 236 93rd YEAR No. 4095

EDITORIAL NOTES

THE DIRECTORATE IN ACTION

WE have now had the pleasure of our first meeting, since his appointment as Director-General of Gas Supply, with Dr. E. W. Smith and his "team"—the first of many, we hope and believe. This is not because Dr. Smith has any ambitions to secure what is commonly called a "good Press." Frankly we do not think he will mind very much what kind of Press he has in that sense of the word. He has his own convictions, the chief of which is probably that no niggardly patching of the Gas Industry or half-hearted temporizing will give it the place it deserves in the future scheme of things—the place which he has always been determined it shall have. But, provided reforms are sufficiently whole-hog, he would much prefer that the Industry should itself work out the plans for its own salvation. In fact, we will go so far as to guess that he intends that it shall be *compelled* to work out its own salvation, starting with the outstanding advantage of having the "team" as a friend at court and, if we read the situation aright, a court which recognizes the absolute necessity of having a really strong, organized, and united Gas Industry in the aforesaid scheme of things both present and to come. Co-operation is therefore to be the watchword, with the Director-General receiving every encouragement from above (even being driven if he requires any driving) to organize a truly fit Gas Industry, and the Director-General offering every help and encouragement (but also, in his turn, driving if necessary) to the Industry to effect a very extensive measure of reform.

To return for one moment to ourselves, the Press, we can assure Dr. Smith that he can rely upon our co-operation, since we realize that he will never regard us in the light of publicity for his administration, but rather as a vehicle for the formulation, dissemination, and discussion of views, whether they be his own, or any which the Industry, or any section of it, may advocate to the contrary. And this constitutes our invitation to the Industry to make use of us in this way in the days of re-organization ahead. The Director-General would regard as the best Press of all one which saved him, and consequently the whole Industry, from any false step.

So we met the "team"; old friends, all of them; surely not forbidding, but certainly grimly determined to get things done. Dr. E. W. Smith, the skipper; J. F. Ronca, with years of experience of gas administration and an intimate knowledge, gathered from without, of the working of the Industry in all its phases; E. J. Fottrell, with equal knowledge gleaned from within, a link with the old order; George Evetts, combining, probably as no one else has succeeded in doing, all the attributes which we have always rather optimistically (and parsimoniously) expected of the men we have appointed "engineer, manager, *and* secretary; and P. Chantler, the young economist who thought it worth while long before the present crisis in our affairs to turn his attention and studies to the Gas Industry. These are the men who, as we have said, have their orders that the Industry is to emerge from the crisis in greater strength than ever before, and who, we believe, are convinced that a much better job can be made of it by co-operation than by coercion, with their assistance and the backing they will receive from "higher up."

These are the plans for the future, which are receiving unceasing thought, and for which the path is being prepared in many ways which will become obvious when the time for action arrives. In the meantime there are pressing matters which demand immediate action, for it must not be forgotten that No. 1 in the Directorate's terms of reference was to ensure adequate gas supplies wherever the national interests call for them. This means, in effect, a night and day effort to keep pace with a war output which has not nearly reached its peak even after more than two years, and, in case of conflicting demands, to satisfy first that which is most urgent. But from our enquiries we have formed the opinion that no nonsense of that kind will be tolerated; enough gas will be found to satisfy *all* demands.

Where, then, are these ever-increasing quantities to come from? The answer, sad as it may sound, is that they do already exist to a very large extent and, as we have suggested on one or two recent occasions, there must be a very drastic overhaul of the way in which existing supplies are being utilized, especially in the large-scale industrial plenty. Preliminary investigations have disclosed instances of working which can only be described as lamentably inefficient and wasteful; the help and advice which the Directorate have already been able to give in their short career have made available for other purposes millions of therms which were literally being wasted.

They have naturally concentrated on areas where a shortage was particularly threatened. They cannot be everywhere at once, but the matter is urgent both from the armament output and the fuel economy point of view, and it is the job to-day of every gas undertaking to see that its products are used to the very best advantage. Not from any fear that "the bogy man will get you if you don't." He undoubtedly will—eventually; but in the meantime there is the all-important factor of winning the war; subsidiarily there is a very large slice of self-interest involved. For, make no mistake, the place the Gas Industry will hold in the fuel plan of the future will depend very substantially upon its performances to-day. It may be that uneconomic usage is sometimes overlooked or even accepted in the heat and struggle of war production. But the figures will remain indelibly on record, available to be brought up in evidence against us when, as it surely will be, "fuel" is the comprehensive term which it ought to be, and the choice of individual sorts is no longer, perhaps, so much a matter of personal predilection as it has been in the past.

We stress this point, and with it the need for "salesmanship in reverse"—a phrase we recently coined to describe the idea that a gas undertaking can no longer rejoice in gas sales unlimited. Gone are the days when an industrial gas research laboratory can judge results almost entirely upon the perfection of the finished product; when an extremely low percentage of wastages can be regarded as compensating for profligacy in fuel usage. Gone, too, are the days when the gas undertaking can afford to shrug its shoulders as to what takes place on the outlet side of the meter, on the theory that its job ends with the delivery of the gas, in whatever quantity may be demanded, at the inlet. We mention this theory because we heard recently of a case of extraordinary inefficiency due to a works management not understanding how to use its gas supply, and the gas undertaking hesitating to interfere "beyond the meter." It was an extreme case, it is true, of which we need not give details, but it certainly was an example of how much gas can often be saved by quite simple means. In the conditions of to-day there is need for a vast extension of the system of "gas chasers," and the chaser need not, as a rule, be a scientist. It is not always the construction of the furnace which is wrong; far more often it is the keeping of three constantly at full heat where, by more careful management, two could do the work comfortably. It is the extravagant safety margin which the operative will so often allow himself in the absence of supervision; ignorance of the use of air slides fitted to the furnace for example. Simple matters such as these demand common sense rather than a university degree, and there must be literally thousands of cases where, by sympathetic handling of the men, and with the co-operation which the gas undertaking should be glad to give, a chaser could save his year's salary in a week, if such argument

is of more potency than the very obvious need to conserve the nation's fuel resources.

We therefore put it most strongly to every gas undertaking that, in the present emergency, the gas they make, or buy, is not theirs in the sense that they can sell it and thereafter take no further interest in it. Pre-occupied as they are with other matters—with coal shortage, benzole extraction, and a thousand orders and regulations—it is expected of them that they shall more than ever help their consumers to put their products to the best possible war-winning use. Moreover, it is very strongly in their own interests to do so.

And there, for the moment, we must leave consideration of the problems facing the Directorate of Gas Supply. Reports reach us of the extraordinary welcome they have received from many quarters—some even quite unexpected. We trust it is a token of such unanimity as will facilitate the smooth and rapid reconstruction of our Industry, ensuring its still greater usefulness in the future, as well as the livelihood of those who have dedicated their lives to its service.

FUEL ECONOMY

FURTHER emphasis on the urgent need for exercising rigid economy in the use of coal, coke, gas, oil, and electricity was laid in the Twenty-Fourth Report, just issued, of the Select Committee on National Expenditure, which states bluntly that, in spite of appeals, there has been a negligible increase in the coal production of the mining industry as a whole, and that indisputable evidence has been received that avoidable absenteeism is still a main cause. The root of the trouble of gas and coke shortage, as we have said so many times, lies in inadequate coal supplies; a return of skilled miners to the pits is imperative. Now the Committee admits that one ton of coal carbonized produces gas and coke equivalent in work value to 1¼ tons of raw coal—this quite apart from by-products essential to the war effort. Logically, the fuller use of gas for domestic purposes might well justify encouragement. This, the report observes, is "a matter of considerable importance and provides a strong argument for increasing the winning of gas coal from the pits." We have reason to believe in this connexion that even now good Yorkshire and Lancashire coals with high volatile content and with fairly good coking qualities are sold as house and sometimes as steam coals. However, the position is that there is lack of coal, and that the munition industries must have prior claims on available supplies, for use either directly, or indirectly through gas and electricity. Hence the appeal to the domestic consumer to "go slow" in the use of all forms of fuel. If the appeal is not effective—and the Gas Industry, in the national interest, wants by its support to make it effective—then the domestic consumer will have to face some form of compulsion, though it is difficult to envisage an equitable or even a workable scheme of compulsory rationing.

In its consideration of the sorry coal position, the Select Committee deals with this problem of compulsory rationing. So far as coal, coke, and oil are concerned, economy can be assured by withholding the supply of these tangible products. When dealing with the intangible products gas and electricity, difficulties at once present themselves. Gas must be continuously on tap for consumers. It is impracticable to curtail supply by cutting off the consumer when he has had his allotted ration. The consumer is therefore able to exceed his ration of gas, and consequently the harm may be done before any practical remedy can be applied. If it be suggested that offending consumers might have their supplies disconnected, then thousands of workers in war industries would almost certainly be involved. Any step which might result in workers returning home from work to find no means of lighting, heating, or cooking is not a workable proposition.

Again, what would be the starting-point for the rationing of gas? When the Fuel and Lighting Order was issued in 1939 the limit was fixed at 75% of the quantity of gas consumed in the corresponding quarter of the year ended June 30, 1939, and it was not intended that consumers should be rationed below 100 therms. Following the issue of the Order it was quickly announced that rationing would not apply to prepayment consumers, and this announcement by the Mines Department was shortly followed by the decision to increase the ration to 100% instead of 75%. The Order was not, of course, enforced. According to the Select Committee's report any new basis for the assessment of the gas ration would probably be the December quarter of 1939 and the March quarter of 1940, for in the corresponding quarters of the subsequent year some economies were practised by domestic consumers. In the meantime, however, there have been scores of thousands of removals by reason of evacuation, removal of staffs to other areas, and so on. It is obvious that the establishment of a basis for comparison, essential for any rationing scheme, must present untold difficulties—difficulties so numerous and so formidable that it would seem impossible to frame any rationing scheme which would not be cumbersome and highly expensive from the point of view of administration.

COMPULSORY BENZOLE EXTRACTION

THE cessation of a state of uncertainty frequently brings with it a feeling of great relief. We believe it is in this way that many gas engineers will regard the General Direction, dated Oct. 24, given by the Board of Trade under Regulations 55 and 56 of the Defence (General) Regulations, 1939 (S.R. and O. 1941, No. 1714), which introduces at all events a measure of compulsory benzole extraction. Very few, we are certain, have been truly obstructionist under the repeated appeals, since the outbreak of war, for a maximum possible output of that great need of modern warfare—toluene. But there has been a very much larger class who have been assailed by doubts as to their calorific obligations, their financial results, or other matters for which they are answerable to their boards or committees, and many of these, we know, have long sighed for an authoritative order which would give them the necessary backing in any risks which they might be running, and enable them to go right ahead with what they know is truly a national obligation. Those already in possession of extraction plant have now this backing to the full. While we have no authority for suggesting it, it would be a fair guess that the powers-that-be would gladly extend the Order to those who have not. If with our steadily increasing war effort the need should arise, even the difficulties of material, finance, etc., in connexion with additional plant requirements might well be surmounted. But that time is not yet; with full co-operation by the willing, and a realization by the hesitant that business really is meant, we believe all present requirements can be met.

The steps by which this stage of semi-compulsion has been reached need not be traced in detail, but it is well to emphasize that no new departure in technique is implied. We recall an admirable brochure which was issued early in the war to all members by The Institution of Gas Engineers, which should have been of the utmost use to anybody seeking to secure the maximum recovery of toluene from gas. Its perusal can be recommended even to-day to those who have acquired a fresh enthusiasm with the introduction of the new Direction. We have even heard of the home-made plant of a 19-million works, costing, it is remoured, £18 to erect, and recovering up to 3 gallons, so that no actual technical obstacle would seem to stand in the way where there's a will.

As long ago as July 10, 1940, we recorded the setting up, by the Secretary for Mines, of an Advisory Committee on Benzole Recovery, and the personnel of the Committee, which we believe has not materially altered in the meantime, is sufficient guarantee to the Gas Industry that full consideration will have been given to any difficulties to which the new Direction may give rise—full consideration with complete understanding, both from the administrative and technical points of view, of the implications of the Order. It is general knowledge, too, that the national bodies of the Industry have been fully called into consultation at all times on the benzole situation and, though no particulars have been divulged of any representations they may have made, it can be assumed that sympathetic, and understanding, consideration will have been given to them. In fact, the whole

Direction displays the wisdom of a Government Department's co-operation with an industry, as compared with the not unknown process of issuing directions with a lack of understanding of circumstances, which in the end so often prove impracticable, or at the best can only be carried through subject to general dislocation.

We feel sure, then, that it is intended to administer the Direction in a sympathetic manner. At the same time we do not think that evasion or obstruction will be tolerated; and quite rightly so. It will be observed that the authorities have reserved for themselves "right of entry" and examination (sub-section 4). We would, however, much prefer to commend to our readers another type of visit which is available, though not specially mentioned in the Direction. To any undertaking which has the slightest problem to solve in connexion with its benzole and toluene process the Committee is, we believe, prepared to dispatch an expert who will examine and advise; and of this service the utmost use should be made.

On the subject of the permissible exceptions (sub-section 2), we can only say that coal supply is beyond the control of any undertaking, and that it will be the constant prayer of every executive that he will not have to shut-down the benzole plant because he has less than two weeks' stock of coal. We may hope, indeed, that in the national interest the Ministry will see that such circumstances do not arise. As regards the 60 hours per month "grace," this is doubtless designed to cover such normal exigencies as the maintenance of output and calorific value during peak load periods. It seems generous enough apart from quite exceptional happenings, as, for example, air-raid damage. But, as we have already stated, we have faith in the Committee and its intelligent handling of any unusual conditions which may arise.

In no phase of the question is such understanding more welcome than in respect of calorific value obligations. It will be noted that no powers have been taken to compel redeclarations, if found necessary, at lower values, which would perhaps have been the most direct road, technically speaking, to increased benzole yields. On the other hand, it might have involved complications with other Government Departments which are principally concerned with the legal aspects of gas supply. Yet it is quite obvious that without alteration in the declared calorific value it becomes necessary with full benzole extraction to make a higher calorific gas in the retort or to decrease water gas dilution. Either of these steps, again, may involve difficulty, particularly in view of coal stocks and coal supplies, and indeed, to the Advisory Committee with all its knowledge of gas processes and administration, it is undoubtedly clear that many difficulties are involved. It is certain, however, that the Industry will play the game and will set about solving these difficulties forthwith. Many undertakings already, as recorded in our pages in recent months, have voluntarily redeclared calorific values in order to adapt their processes to wartime conditions. Others will most likely follow suit and, though the actual legal process of redeclaration is of course only a small part of the trouble involved, it is good to know that its machinery has been so completely simplified to meet the circumstances of to-day. The former lengthy official process has been changed to what amounts to immediate action; redeclaration no longer presents a legal problem.

There is just one other point to which we would refer, and it is an important one. We believe that in some places the idea still exists that vertical retort gas is not a happy medium from which to extract benzole. It must be emphasized that the Government wants low-gravity benzole as well as high-gravity benzole. As long ago as 1939 the Minister of Supply, when the Control of Toluene Order was introduced, made this quite clear. He stated categorically that the Government needed all the toluene it could obtain from the Gas Industry, and assurance was given to the Gas Industry that low-gravity benzole as extracted from the gas produced in continuous vertical retorts was included in the Order, though in the Order as published there was no specific mention of this. We called attention to this demand in the "JOURNAL" in November two years ago, and reiterate the fact at the present juncture to dissipate any lingering doubt in the minds of engineers and managers of gas undertakings employing continuous verticals.

At the Industry's Cinema

Twinkling gold lights might have been blazing over the portals of 1, Grosvenor Place, if it had been peacetime on Nov. 4, to show to the world in true cinema fashion that Gas Industry House had taken on yet another role—that of picture house—in addition to the many parts which it has already played since becoming the headquarters of the Industry. The lecture hall made a splendid auditorium, and even had some such famous "star" as Greta Garbo been appearing as the catering manageress in the new B.C.G.A. film, "Eating at Work," which was shown for the first time on that day, a larger audience could hardly have been forthcoming. With an introduction by Sir David Milne-Watson, and the presence of representatives from all sections of the Industry, together with deputies from ten Government departments, the new film certainly met with an auspicious pre-view. The Gas Industry has been a producer of films since 1934, as Sir David recalled, and has made in all about thirty films. These have won for themselves and the Industry a deserved reputation, and congratulations are due to Mr. W. J. Sandeman, and the B.C.G.A., on the new film, which deals with a subject of the greatest importance at the present time—canteens for war workers. "Eating at Work" will prove, we feel sure, a worthy addition to an already successful repertoire.

Obituary

Mr. STEPHEN DEMPSTER HEYWOOD has died very suddenly after a brief illness. He was a nephew of Mr. Charles Dempster and a Director of Messrs. R. & J. Dempster, Ltd.

COMPULSORY RECOVERY OF BENZOLE

The following is the text of a Direction (S. R. & O., 1941, No. 1714) given by the Board of Trade under Regulations 55 and 56 of the Defence (General) Regulations, 1939, relating to benzole recovery by gas undertakings:

1. Every undertaker shall, as from Nov. 17, 1941, except as hereinafter mentioned or in so far as the Board of Trade may by Special Direction otherwise direct, cause all gas (whether or not mixed with water gas either carburetted or not) produced by the carbonization of coal at his undertaking to be treated by passing through plant for the recovery of benzole and in such manner as will extract to the fullest capacity of that plant the crude benzole in such gas so as to yield the maximum amount of toluene therefrom.

2. (1) Notwithstanding anything to the contrary contained in paragraph 1 of this General Direction, an undertaker shall not be bound to cause gas produced as aforesaid to be treated as therein mentioned:

(*a*) during such periods (if any) as the supply of coal held in stock by the undertaker is insufficient to enable the estimated quantity of gas required for supply from that undertaking during the period of the two weeks immediately next ensuing to be produced at the undertaking.

(*b*) during periods not exceeding in the aggregate sixty hours in any month.

(2) In the event of an undertaker not causing such gas to be treated as aforesaid in pursuance of the provisions of:

(*a*) sub-head (*a*) of sub-paragraph (i) of this paragraph, he shall, both immediately when such gas has ceased to be so treated and also when such gas is again so treated, give notice thereof to the Board of Trade;

(*b*) sub-head (*b*) of such sub-paragraph, he shall forthwith record in a book to be kept for that purpose the date and times of the beginning and ending of each period and the purpose thereof.

3. No undertaker shall dispose of any plant for the recovery of benzole in his possession on the date on which this General Direction is given except with the written consent of the Board of Trade and subject to such conditions (if any) as the Board of Trade shall deem necessary.

4. An undertaker, and his agents and servants, shall, with a view to securing compliance with this General Direction, or with any Special Direction, give on demand to any person, or to any person of such class or description, authorized by the Board of Trade in that behalf samples of any coal and of any by-product of coal and of any substance (whether liquid or not) used for the purpose of or in connexion with plant for recovery of benzole on any premises in his possession or used for the purposes of the undertaking carried on by him, and shall permit any such person as aforesaid to test at such places and times and in such manner as he thinks fit any gas (whether or not mixed with water gas either carburetted or not) produced by the carbonization of coal on such premises.

A similar Order (S. R. & O., 1941, No. 1715) applies to the coke oven industry.

WHAT OF THE FUTURE?

A MEETING of the London and Southern District Junior Gas Association took place on Oct. 31 at the Westminster Technical Institute, when there was a discussion—an animated one—on the Institution Symposium Papers. Mr. F. O. HAWES, of the Tottenham and District Gas Company, presided over a good attendance. We give here an outline of the trend of the discussion and of the arguments advanced.

On the subject of the sulphur content of the gas distributed, the **President** said that of course sulphur must be reduced to a figure which gave no trouble on the district; and when one considered the relationship between manufacturing costs and the price at which gas was sold, the cost of sulphur removal was negligible. That was one item of standardization. Another, this time concerning appliances, was thermostat calibration for oven cooking, which could easily be, and should be, made uniform. Future policy must have as a basic consideration the interests of the consumer; and the manufacturers of gas must assist the manufacturers of appliances by supplying gas of suitable and uniform characteristics. In this regard, the best sort of gas to supply was that which was most flexible. Calorific value was not the only criterion; specific gravity and combustion characteristics came into the picture. One could visualize, however, gases—a very few in number—of defined calorific value divided into types according to their general efficiency and flexibility in use. Gas having a calorific value of, say, 500 B.Th.U. per cu.ft. might, for example, be divided into groups A, B, C, and D. Similarly, there could be four groups of 450 B.Th.U. which would give consistent results and would help the manufacturers of appliances. Some practices, such as abnormal additions of blue water gas during periods of peak load, would have to be restricted. Mr. Hawes said he had been studying a few statistics. According to the "GAS JOURNAL" Directory there were 109 undertakings having no other carbonizing plant than horizontal retorts whose declared calorific values ranged from below 500 to 400 B.Th.U. per cu.ft. True, a few of these undertakings were situated in what might be termed special districts; but there was no reason geographically for such heavy dilution of the gas made in horizontal retorts. Why should the public be asked to put up with this type of gas service?

Mr. **D. A. Johnston** (South Metropolitan Gas Company) said that the future must see any form of lip service to the consumer replaced by real service, and the buying power of the consumer must be fully considered. Future planning must be based on (*a*) sincerity, (*b*) realism, (*c*) clear thinking.

Mr. **F. C. Smith** (Gas Light and Coke Company) put forward the view that one could burn almost any type of gas satisfactorily provided the quality of that gas was uniform, though, of course, some gases were more flexible than others and allowed of greater variation. Looking to the future, it must be borne in mind that the Gas Industry was not a new industry. It had a large amount of plant which for obvious reasons could not usefully be scrapped at one fell swoop.

Mr. **Pepper** (Gas Light and Coke Company) suggested that the maximum quantity of by-products from coal by carbonization could be produced by declaring a standard calorific value of 400 B.Th.U per cu.ft. With suitable coal allocation such a standard could be established for the whole of England, and then would follow the standardization of appliances.

Mr. **Moys** (Commercial Gas Company) said that standardization of calorific value had to come and that values could well be settled on a regional basis—and regional planning was to his mind inevitable. The gas which suited the majority of undertakings within an area would have to be distributed.

Mr. **L. W. Andrew** (Gas Light and Coke Company) queried what the average person really thought about gas, and suggested that he considered it in the light of "second best"—wrongly so, through lack of knowledge. The gas consumer was in fact very slow to complain; and he (the speaker) thought that a good purpose would be served if members of committees dealing with standardization were sent out on the district to interview, not people who complained, but people who did not complain. He thought that there was really no accurate conception of the comparative costs of fuels, and that appliances should be looked upon from their gas load building capacities and offered to the public at prices bearing some relationship to these capacities.

Mr. **Twist** (South Metropolitan Gas Company) remarked that from the years 1920 to 1939 there had been a large increase in the number of gas consumers, but during the same period there had been a decrease in the amount of gas consumed per consumer. This decline in consumption per consumer should be a matter of concern. More than 65% of the Gas Industry's sales of gas was burned by the domestic consumer. Of the homes in the country, 80% had a gas supply, yet only one-fifth of the total cooking, heating, and water heating was carried out by gas. The reason, he thought, was a matter of price—which should be under 6d. a therm—and the small consumer did not pay his proper share of the cost incurred in supplying him. The Government must realize the importance of the Industry and help in the putting-over of suitable tariffs.

EATING AT WORK

IF Charles Dickens, waking after a long sleep in the Rip Van Winkle manner, could have been present at the preview of the new B.C.G.A. film, "Eating at Work," shown at Gas Industry House on Nov. 4, he would have found something very different about which to write. Conditions have indeed changed since the days when Dickens toiled the day long in a dismal blacklead factory, and the new film shows just how far they have improved.

In introducing "Eating at Work," Sir David Milne-Watson said that it was produced in support of the Government's plans for ensuring proper meals for the factory worker. "It shows," said Sir David, "how the provision of proper factory canteen facilities operates to the benefit of the health and cheerfulness of the worker—and consequently to the benefit of the output." He went on to point out that community feeding centres of the sort shown in the film also helped tremendously towards fuel economy.

"Eating at Work" brings to life a scene which is familiar to many, that of a large war factory, typical of the number now spread all over our country. Work ended for the time being, we see men and women flocking to the canteen which has been provided for them at their factory. It is bright and spacious, and willing helpers swiftly hand out to the workers very liberal platefuls of what looks to be very good fare. Then we are taken behind the scenes to see what careful planning and hard work is needed in the running of a successful canteen. Finally the film closes to the music and laughter of an E.N.S.A. concert.

In a speech after the showing of the film, Miss Johnson, of the Ministry of Labour, pointed out the many difficulties that had to be overcome in setting up canteens, such as the need for special buildings in present conditions, and the shortage of materials, supplies and labour. The enumeration of these problems suggested that it might have been of very definite help to canteens if some of these difficulties could have been introduced into "Eating at Work." The very capable manageress in the film would most certainly have found some solution which would have given the lead to others who might find themselves placed in similar circumstances.

Whether all factories have such excellent canteen arrangements as the one pictured we are not told, and we suspect that there are a goodly number that are not in such successful operation. A shot or two of weary workers trudging long distances home to inadequate meals—with the consequent wastage of fuel, loss of time, etc.—might have more forcefully stressed the point that it is in the interests of every management to plan arrangements for adequate canteens at their own factories.

It is a question, too, whether some contrast with the bad old days of Dickens might not have been an advantage to the film. If something of the sort had been incorporated, workers who are eventually to see the film would realize in highlight exactly how much is being done to make their lot easy.

At the risk of appearing incredulous, there is a small point that occurs. Would not most audiences be glad to see a little more of that miraculous potato peeler? A feeling of frustration was engendered on being whisked away to Mrs. Williams baking cakes before its innermost secrets had been revealed.

These, however, are merely minor details, and the chief impression which the film leaves in the mind is one of a bright, cheerful—and above all instructive—entertainment.

In accordance with the usual policy, gas is not brought into the limelight, and some may think that in this present film the Industry has rather hidden its "light under a bushel." After all, credit should be given where credit is due, and gas is doing a great deal in the tremendous new movement known as communal feeding, so perhaps some subtle mention of the fact might have been made.

The interest which the Gas Industry is taking in this nation-wide change towards communal feeding was brought into prominence by Mr. Cyril G. Davis, at the close of the film, when he opened an exhibition of equipment for British Restaurants. This included an "Eagle" range, an "Eagle" boiler, an "Equator" storage water heater, an "Ascot" instantaneous water heater, a "Stott" counter set, and an Ash's fish fryer. The apparatus displayed, said Mr. Davis, by no means represented the very large range of cooking equipment which the Gas Industry was able to offer.

On Wednesday, Nov. 19, at 1.45 p.m., at the Royal Society of Arts, a Paper on "Lighting in Wartime" will be read by Mr. J. S. Dow, Hon. Secretary of the Illuminating Engineering Society.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

WEIGHTING GASHOLDERS TO INCREASE GAS PRESSURE

By LEONARD BOTT

MANY gas engineers feel the need of a higher pressure on the district. As I have been asked during the last two years to advise on nine gasholders, with a view to weighting them, most of which have been weighted successfully, I may be of assistance to many others by publishing methods adopted and results obtained. There were no unsuccessful attempts. One gasholder was found unsuitable for additional pressure, due to the loss of a large volume of gas at each uncupping.

The needs for increased pressures arise from various causes. First, the greater demand for gas, which must be supplied through mains too small in diameter for such increase. Then the acquisition of other gas-works and the closing down of the gas-making plant there, which means passing a larger volume of gas through mains prepared for the central locality only. Again, the inevitable reduction of the internal diameter of gas pipes by rust.

FIG. 1.

Before attempting to increase the pressure of gas at the holder one must ascertain :

A. Is the gasholder sheeting capable of safely carrying the increased pressure required ?

B. In the case of a telescopic holder, does the cup sealing water run over the dip when uncupping and, later (in the same operation), does gas escape freely from the cup ?

C. Will the increased weight cause too much back-pressure for the ancillary plant ?

D. Is it likely to "blow" the seal of water luted purifiers ?

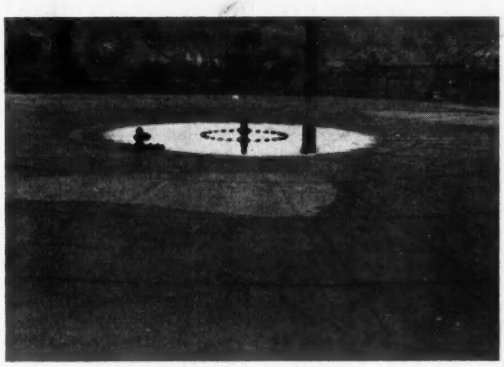

FIG. 2.

Considering "A" the sheeting must be examined as to thickness in its most reduced places. The riveting and laps should be in tight condition. The effect of the weighting will be most on the crown sheeting about one-third of the distance from the top curb to the centre. Some gasholders have little clearance between the inner lifts and the dip in which they ascend and descend. Especially is this the case half-way up the innermost lift, where they are inclined to be barrel-shaped. As the sheeting is never uniformly cylindrical, the looser portions will be forced outwards by increased internal pressure and, possibly, may rub the rivets inside the dip.

A short time before writing this I inspected a 500,000 cu.ft. gasholder of three lifts, in which it would not be wise to increase the internal pressure because, at present, the middle lift rivet heads contact the inner edge of the outer lift dip all around, at the halfway position.

"B" if water is lost from the cup, by running away over the dip, either when cupping or uncupping; this is usually a precursor to a loss of gas as the next uncupping takes place. To weight a gasholder to give 2 in. extra pressure will cause this gas escape to continue during an extra 1 in. of travel of the innermost lift downwards. The responsible engineer may decide that, as the lifts are rarely disengaged (it being necessary to keep the highest pressure on the district), the loss of gas would be negligible and, so, decide on the weighting. It is often advocated that weighting should be done at as low a position as possible, so as to keep the centre of gravity as near to the base as possible. On two occasions I have seen two-lift gasholders, with a cup on the outer lift preparatory to the addition of a third lift. These cups have been filled with bricks to increase the pressure. Such a method serves the purpose until the lifts uncup. At such a time the help of the ballast is entirely lost. In the case of a single lift prepared with cup, for a second lift, provided the crown is in good condition the cup may be loaded and the increased pressure will be constant. Even under these latter conditions there is no advantage over the loading of the crown sheeting if this is correctly done.

There is a widespread but erroneous opinion that the top curb of the inner lift is the best position to place the extra weight. See fig. 1, where bricks are placed closely on the top curb, which curb is left square, so providing a shelf on which, without any additions, water and dirt are held around the rivets. With the bricks, or any other such like weights, the mud is held more effectively still. It can be

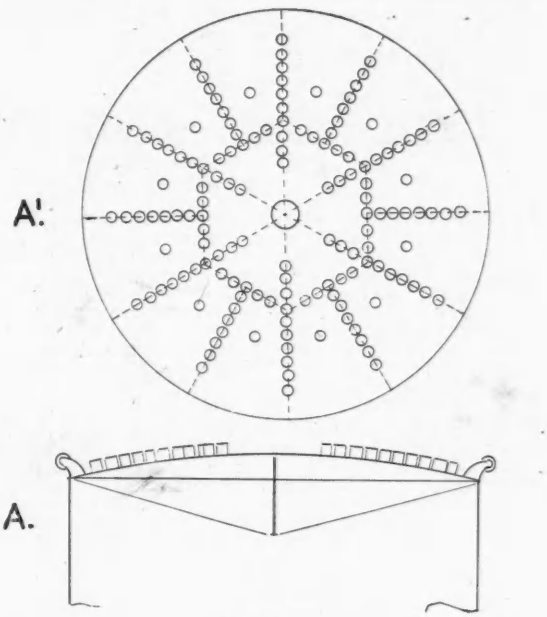

FIG. 3.

said that bricks or other units of weight will load the curb equally all round. This cannot be claimed where a miscellaneous collection of retort mouthpieces, blocks of Aberdeen granite, cast-iron tanks, discarded Livesey washers, and condenser heads are placed as near to the curb as possible without regard for evenness of weight distribution. The crown sheeting of a gasholder is more strained than any other part of the sheeting. The natural tendency of the gas container is to take a spherical form; the more intense the pressure, the more this tendency prevails. If the crown framing rafters were carried upwards, conically, from about 6 ft. from the centre, instead of adhering strictly to the spherical—the centre sheet made like a shallow cone, to match and the first ring of taper sheets set out to suit—there would be no centres like that shown in fig. 2. The same effect could be achieved by retaining the present shape of rafters and providing graduated packings for the sheeting.

With a fixed pressure the shorter the radius of the sphere, the stronger the container will be. Now, the radius of the curve of the sides is always shorter than that of the part of a sphere forming the crown and, while the sides are not spherical but cylindrical, they are of such form that the internal pressure imposes strains almost perfectly tensional. On the other hand, the pressure on the crown tends to shorten the radius of the curve by pressing and raising upwards the sheeting about one-third of the distance from curb to centre. It is at this circle then that the most intense pressure is exerted and it is here, also, where the sheeting is most lifted off its framing. It follows, therefore, that here weights will relieve the sheets of the extra lift upwards and, consequently, the extra pressure caused by their total weight. To put it simply, the extra strain lifting the sheeting upwards is equalled by the ballast pressing downwards.

Another factor arises. When the crown sheeting is raised to its maximum, one-third of the distance between curb and centre, it spoils the true spherical shape of the crown and leaves the centre depressed. Here, then, is the solution to the problem presented to many engineers. "Why does my gasholder crown, being part of a sphere, not shed off all rain water?" The answer is because the sheeting has been lifted more between curb and centre than it has at the centre.

FIG. 4.

There is another deterrent to the centre lifting which is illustrated in fig. 2. A perfectly level centre plate, often 4 to 6 ft. diameter, is securely riveted to a series of narrow sheets, which have not been set to the curb of the sphere. The whole of this stubbornly opposes any tendency to bend and so a flat place, from 6 to 12 ft., often exists at the crown of a gasholder. Therefore, if the weight required be divided into units of 1 cwt. and moulded into concrete blocks of any convenient shape, these can be placed as shown at A and A' (fig. 3), and so placed that, should the holder be deflated, they rest on the crown framing. When painting is being done, they are easily movable, more easily than a retort mouthpiece. The surface can be cleaned and painted and, when dry, the weight replaced. Fig. 4 is of a two-lift gasholder 285,000 cu.ft. capacity which, four years ago, was loaded in the manner indicated.

Although done on my recommendation and to my suggestions, I do not advocate putting any weights directly in the centre as some are shown to be here. The continuous rows are over the main rafters as indicated by their direction from standard to standard. The shorter rows are on the secondary rafters. The water retained in the centre of fig. 2 is caused, to some extent, by the sheeting being bolted down there. The patches in the depression tell their own tale of cause and effect.

Recently I was called to a gas-works where were two gasholders, one, a three lift, comparatively small in diameter and with deep lifts, giving a pressure of 9.2 in., the other, a three lift with greater diameter and lifts of similar depth, giving a pressure of 8.5 in. The engineer said that he could not raise the outer lift of the first unless the gas was boosted into it. To use the booster meant shutting off much of his ancillary plant and generally upsetting things. I suggested counterbalancing the outer lift only of the high-pressure holder until it gave 8.7 in., and weighting of the lower pressure holder until it registered about 9 in. If the gasholders respond well to the necessary inspection this will be done. Concrete blocks will be used. Some engineers who have so weighted their gasholders have painted the blocks the same colour as the crown. Another, who left them natural concrete colour, has had a letter of satisfaction from the camouflage authority that his scheme is very effective.

THE AIMS AND FUNCTIONS OF PUBLICITY*

3. HOW CAN ADVERTISING BE JUDGED?

TO call advertising an inexact science would be an epigram of average smartness and about average truth content. Certain laws have been established by evidence which accumulated haphazardly. Others are matters of common knowledge or common sense. Others have been discovered by deliberate experiments on large numbers of people. For example, the combination of two colours most forcible in catching the eye was found in this way to be black on yellow. (Remember, by the way, that force is the value claimed for this combination, not charm.)

A Concrete Example

It is known that the best day for putting a mail order advertisement in the papers is Sunday. An advertisement of this kind may be selling something, giving something away free (a booklet or a sample), or simply asking money for charity. Common to all forms is that the reader is asked to write, sending his order, his request, or his gift. Sunday is the day when people have most leisure to read newspapers, and also to make up their minds to take the trouble of writing an extra letter or filling in a coupon. Nearly all the replies the advertiser is ever to receive will arrive early in the current week. On the face of it, to decide whether an advertisement was good at its job, average, or poor, should be easy. On the contrary, the same advertisement may have widely varying results—it largely depends on the weather. A wet Sunday is far more favourable than a fine one. From the mail order point of view the ideal day is one which compels everyone to stay indoors reading the papers, and has nothing to distract them from writing in for everything on offer when they have finished. This is an example of an advertising law in itself, but it is also an example of the unpredictable factors affecting advertising results.

This instance is given because you can follow a mail order transaction from advertisement to sale in a short time and still you cannot be certain of judging it fairly. When there is no defined period between advertisement and sale it is harder still to judge the effect of advertising. Some campaigns try for instant effects, others move more slowly. (Some work well but too slowly and are stopped by impatient manufacturers just when they are beginning to show results.) Lines on sales graphs, soaring, plunging, or apparently taking no notice at all of the advertising, are some indication, but it is rare that a rise or fall in sales can be credited entirely to advertising. If sales of goods go up or down over a period it may be due to a change in marketing methods, an improvement in service, the appearance of a new competitor or a spurt by an old one, or because more people have good jobs and money to spend, or are poorly paid, out of work, and out of the market. There is, however, one result which to advertising agents has every appearance of a law, which is that when a client has a bad year he will blame the advertising first.

The uncertainty of advertising results leads some extremists to assert that it is useless and a waste of money. There are, however, two conditions at least in which results can be definitely promised—one when advertising is applied to a product for the first time, the other when it is withdrawn altogether. In the first case the manufacturer is nearly sure to be astonished by the increase in his sales, in the second by the rate at which his customers disappear. Somewhere between these extremes advertising has an undeniable power, and there are, of course, many instances in which, making every allowance for other causes, you can see that advertising has been far the most important element in increasing or maintaining sales. Although inexact it is still a science.

The maker of advertising is not arrogant about his powers. At conferences on new advertising campaigns two questions are almost routine. They have to be answered before the business goes any further. The first is, "How much money are we to spend?" The other is, "What is the distribution like?" Advertising deals with intangibles. Distribution covers the actual exchange of cash money against goods. Advertising can paint such a picture of a product that old ladies will come cycling in from miles around to buy it. Imagine their fury if they cannot get it because there is none in the shops. The rudiments of distribution are to make goods easily obtainable by everyone who tries to buy. Next in order, as advertisers well know, used to be the importance of display. (This has been confused at present because the most popular goods never get on to the shelves but are hidden under counters.) As a matter of historical fact, travellers were always begging shopkeepers to put up their showcards, or better still to arrange piles of their particular goods where they could not fail to catch the eye. Various reasons with psychological names were advanced for this. They all meant that the most important step in a sale is when a customer sees the goods before her and has only to stretch out her hand with money in it to make them hers. With pictures and lyrical prose advertisements try to approach this moment, but how remote beside the actual visible thing.

Showrooms the Centre of Advertising

The Gas Industry starts ahead of most manufacturers in having its own distribution. It does not have to woo shopkeepers against competing suitors for an adequate display of its products. In a gas showroom only gas products are on show. The gas showroom has to compete for attention against other premises, but once the customer is inside, there is nothing to distract attention from the attractions of gas appliances. The gas showroom is the most vivid centre of gas advertising.

Another basis of successful advertising, and a branch of distribution, is service. Private citizens nearly always judge companies by their personal experiences with individuals. Unfortunately, they do not often mention them until something goes wrong, and then they express themselves loud and clear. The Gas Industry has a record of good service and the advertising makes a strong point of it.

Gas advertising has been successful not only in selling gas appliances and gas, but in presenting the Industry as alert, alive, and friendly. It could only do this because the members of the Industry made it true. One sure law of advertising is that once the public detects false claims it remains in a state of suspicious rage.

* The third of a series of articles on various aspects of publicity specially contributed to the "GAS JOURNAL" by the British Commercial Gas Association. Previous articles appeared in the "JOURNAL" of Sept. 24 and Oct. 15.

CARBURIZING STEEL WITH TOWN GAS*

RECENT INVESTIGATIONS BY THE NATIONAL GAS ASSOCIATION OF AUSTRALIA

By A. S. FITZPATRICK, *Chief Research Officer*

THE pressing wartime needs in Australian industries have led to investigations being made by the Melbourne Laboratory of the Association into the possibility of carburizing steel with town gas. The objective of such work is the production of a hard-wearing surface (the "case") on low carbon steel and, at the same time, the retention or increase of toughness of the "core" of the metal.

This process, which is also referred to as case carburizing or hardening, or partial cementation, dates back to Egyptian times about 1200 to 200 B.C. The carburization, or impregnation of the surface by which the carbon content is sufficiently raised, may be achieved by the use of solid, gaseous, or liquid media. Solid carburizing, often referred to as "pack carburizing," was the first method employed, and is still the most common way of developing hard cases on low carbon steels.

Since, however, even with solid carburizing agents, the actual mechanism of the dissolution or diffusion of the carbon into the steel surface appears to be through the intermediate formation of a gas —usually carbon monoxide—it was natural that efforts should be made to utilize gases directly as carburizing agents. Although the earliest references include Papers by Caron in 1860 and Mannesmann (1879), the fundamentals were most completely dealt with in the pioneer work of Giolitti and his co-workers in Italy between 1908 and 1910, the whole story of which was told by Giolitti in 1915 in an English translation of his book, *The Cementation of Iron and Steel*. In U.S.A., A. W. Machlet, of the American Gas Furnace Company, in 1906, had obtained patents for rotary batch type gas carburizing furnaces, and in 1909 the first large installation for gas carburizing was made by the Buick Motor Company.

Since that date, valuable Papers, mainly from U.S.A., have been contributed by Bramly (1926–1929), Cowan (1931–37), Jominy (1931), Guthrie, McQuaid, Williams, and others. The commercial development has been rapid in U.S.A., and E. F. Davis, in a Paper before the American Society of Metals, in October, 1937, stated:

"There is no question but that pack carburizing is steadily losing ground by the advent of the retort, pit type, and continuous gas furnaces. The increasing number of gas carburizing installations, that have gone into the larger as well as the smaller plants, is evidence of the inroads this method is making. Pack hardening is an antique heirloom from the past, and the process of carburizing has progressed in one generation more than it did in all the previous centuries. However, we have always carburized with gas, for the luted box filled with carbonaceous material is essentially a small individual gas unit capable of slowly generating sufficient active gas to accomplish the phenomenon of carburizing."

Commercial activity on a large scale occurred in U.S.A. between 1916 and 1920 through the rapid growth of the automobile industry, the horizontal rotary type of batch furnace being mostly used. In 1924 a few vertical stationary furnaces were used, but these found little favour until between 1927 and 1929, when there was a demand for heavier parts to be carburized in quantity. The continuous gas carburizer using a horizontal tunnel-shaped heating and carburizing muffle zone through which the work is pushed is the product of the last ten years. Within the last few years gas carburizing has come to its present high stage of development, mainly through the advent of cheap and convenient gaseous media.

Gases for Carburizing

Detailed studies have been made of the carburizing effects of town gas, natural gas, propane, butane, carbon monoxide, methane, carbon dioxide, and many other gaseous compounds. At the present day, many furnaces are being operated with specially prepared atmospheres which are known by trade names. So far as we are concerned in Australia, the results of work on town gas are of most interest.

Experience in U.S.A. has, according to Williams, shown that, where appreciable variations in composition occur in town gas, such variations will cause unevenness in carburized cases. In some localities the variations have been insufficient to cause trouble. Guthrie concluded that variations in moisture content were more significant than the actual dry gas analysis. He therefore evolved a standard procedure consisting of dehydration and then the addition of a definite amount of water which then gave reproducible results. Town gas, generally, is regarded as a weakly carburizing gas compared with propane, butane, &c. The latter rich hydrocarbon gases must, however, in most cases be diluted with air, flue gas, or dissociated ammonia.

Uniform temperature is of the greatest importance and a variation of 10 degrees is the maximum permissible. The closer the temperature control the more consistent should be the results. The actual carburizing temperature depends on the particular steel being treated but, generally, 920°C. may be taken as the upper limit.

When goods are placed in a muffle and a pressure of gas is maintained, the effect is to increase the hydrocarbon content per unit of volume. It is unlikely that the pressure appreciably increases the reaction rate of diffusion of carbon into the steel.

In attempts to increase the rate of penetration of carbon, various experiments have been made on enriching the gases. Thus, town gas has been bubbled through benzole or other volatile liquids—*i.e.*, toluene, xylene, or petrol.

One practice in Germany has been to pass town gas through a heated retort containing carbonaceous compounds to enrich the gas before induction to the carburizing chamber. It appears, however, from the American literature, that the main complaint relating to town gas is not that it is too low in hydrocarbons, but that in some localities the variation in carbon dioxide and in moisture content are too great. The permissible variations are not stated.

It is a common experience, when carburizing with rich hydrocarbon gases, to obtain soot deposition on the goods. Soot is objectionable, since it retards carburizing reactions and may indeed form a protective sheath on the goods being treated. By correct dilution and by preheating, the deposition of soot within the carburizing chamber can usually be prevented.

Melbourne Experiments

Although gas carburizing is now well established in U.S.A., so far as I am aware, this process has not been employed widely in Australia. Owing to the difficulty of obtaining suitable high carbon steels for certain defence and other industrial work, the National Gas Association was recently asked to advise on the carburization of low carbon steels. Samples of these steels to be used in several types of military equipment and others for plough-shares, automobile parts, &c., were submitted for investigation.

The investigations have been carried out in a small No. 0 carburizing machine made by the American Gas Furnace Co. This is a cylindrical tilting furnace of the horizontal rotating type, the inside of the nichrome retort being 5¾ in. diameter and 16 in. long. The furnace takes about 100 cu.ft. of gas (540 B.Th.U cu.ft.) per hour for heating, and, in experiments on very light charges, 15 to 20 cu.ft. of gas per hour were passed through the retort or muffle for carburizing.

In a series of tests on a ¼-in. mild steel plate, samples were given 2, 4, 6, and 8 hour treatment. One batch was treated with town gas alone, another with town gas saturated by bubbling through petrol. On removal from the furnace, the samples were cooled slowly for microscopic examination in the annealed condition. More tests were carried out in which the steel samples after carburizing were heat treated to refine the core and case. The temperatures employed throughout ranged from 920° to 940°C.

Many factors remain to be investigated, but the results to date must be regarded as definitely promising. In the examination of treated specimens we are indebted for the co-operation of the Metallurgy Department, Melbourne Technical College. The table provides an interesting example of the results achieved with ¼-in. plate of low carbon steel (approx. 0.12% carbon), one side of which had been ground before carburizing.

TABLE.—GAS CARBURIZATION OF LOW CARBON STEEL (AT 920°C.).

Sample No.	Carburizing medium.	Carburizing time.	Results.
2	Town gas	2 hrs.	**Unground edge.** Case depth—0.035 in.—no free cementite. **Ground edge.** Total case depth 0.044 in. of which 0.010 in. contains free cementite.
4	Town gas	4 hrs.	**Unground.** Case depth 0.045 in.—no free cementite. **Ground.** Case depth 0.030 in.—no free cementite.
8	Town gas saturated with petrol vapour	2 hrs.	**Unground.** Case depth 0.030 in.—no free cementite. **Ground.** Case depth 0.036 in.—no free cementite.
6	Town gas saturated with petrol vapour	4 hrs.	**Unground.** Total case depth 0.045 in. of which 0.012 in. contains free cementite. **Ground.** Total case depth 0.40 in. to 0.042 in. of which 0.005 in. to 0.015 in. contains free cementite.

From comparison with the above it may be mentioned that with one of the best known solid carburizing compounds on the Melbourne market, the usual case depth for mild steel treated for 6 hours at 900°C. is 0.04 to 0.05 in.

It has been stated that an increase in the carburizing rate occurs when mill scale is present on the surface of the steel. This statement has not been fully substantiated, and our results to date cannot be considered conclusive for or against it.

Although samples treated, as was Sample No. 6, in the above table, showed no free cementite, when the case and core were refined by later heat treatment, it appears that no marked improvement is achieved by addition of petrol vapour to the town gas. This is an advantage since the addition of petrol would be objectionable in factory practice. In the table given, Sample No. 4, which was treated with town gas alone, shows the best results and is comparable in depth with that obtained from pack carburizing at 6 hours.

The ¼-in. mild steel plate, after carburizing and heat treating, gave a file hard surface. Tempering at 190° to 200°C. was necessary to remove brittleness.

* From the *National Gas Bulletin*.

En passant

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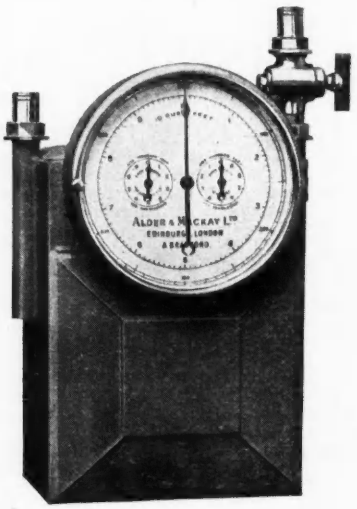

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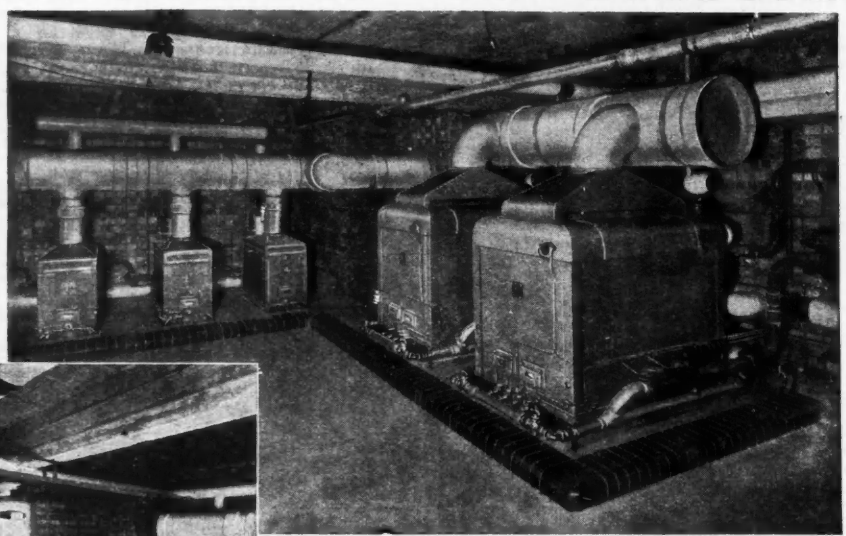

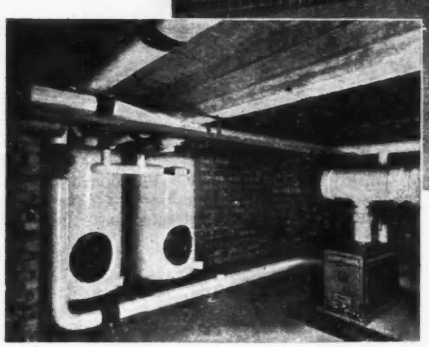

A photograph taken in the Heating Chamber of a new Hospital recently built for War-time requirements, eventually to be applied to the normal activities of the district. Twin "REX" gas-fired heaters having a combined output of 1,500,000 B.Th.U. hourly are provided for low pressure Hot Water Heating, while for Hot Water Service, the plant comprises triple "D" Series "REX" Domestic units, output 600,000 B.Th.U. hourly, with storage of 600 gallons. Floor space and flue capacity are provided for future extensions.

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It is not to be expected that equally good results will be achieved with any type of town gas throughout Australia. Probably the best way to ascertain which gases are suitable will be to submit them to the practical test of carburization.

The approximate composition of gas (Metropolitan Gas Company, Melbourne) used in our experiments was:

Carbon dioxide ...	3·4%
Oxygen ...	0·9%
Unsaturated hydrocarbons	4·1%
Carbon monoxide	17·5%
Methane ...	23·9%
Hydrogen	40·9%
Nitrogen ...	9·3%

To judge from American literature, such a gas is too high in carbon dioxide and too low in methane. Nevertheless, the fact remains that the case depth obtained in a given time is very similar to that state in U.S.A. for natural gas, propane, and butane mixtures.

The preliminary work on gas carburizing carried out in the Melbourne Laboratory of the National Gas Association suggests that, for this type of furnace atmosphere control, there should be considerable scope in Australian factories. Although more research should be carried on to define the full possibilities and limitations of the process, the information already obtained is such as to permit of its immediate adoption for certain steels and for specific purposes. The present indications are that gas carburization will prove its worth in many phases of our wartime effort and will then retain an important position in peacetime industry.

Refining of Benzole

Benzole refining forms the subject of a patent (No. 539,455; application date, Feb. 5, 1940) taken out by the South Metropolitan Gas Company, P. C. Bishop, R. A. Procter, and R. F. Twist.

The patentees point out that two principal methods are at present in use for rendering the volatile liquid hydrocarbons recovered from coal gas suitable for use in internal combustion engines. One of these methods comprises washing the hydrocarbons with sulphuric acid in order to polymerize or otherwise remove unstable constituents which are liable to produce gummy material in the carburetter and other parts of the engine. The other method is that described in Specification No. 289,347, according to which, by the addition of "inhibitors," unsaturated bodies may be prevented from polymerizing to resinous substances without need for washing the liquid hydrocarbons with sulphuric acid.

With certain types of crude liquid hydrocarbons, they add, a treatment with sulphuric acid cannot be altogether avoided, as this treatment has the additional advantages that it substantially decreases the sulphur content of the fuel and improves its colour. These additional advantages are not obtained when the fuel is treated as described in Specification No. 289,347.

In the treatment of the liquid hydrocarbons with sulphuric acid according to the first method, difficulty may arise owing to the formation of a viscous acid sludge in the vessel in which the treatment with acid is conducted, and owing to the formation of stable emulsions with the water which is subsequently used to remove residual acid from the liquid hydrocarbons.

It is known that both these difficulties can be reduced by removing constituents boiling below 80° C. from the liquid hydrocarbons by distillation immediately after their recovery from the coal gas and subjecting the liquid hydrocarbons forthwith to washing with acid. The formation of viscous acid tar and troublesome emulsions is aggravated if the recovered spirit is allowed to stand for any considerable time before it is distilled to remove the constituents boiling below 80° C. In practice circumstances do not always permit application of the refining process immediately after the recovery of the liquid hydrocarbons from the coal gas, and the formation of viscous acid tar and emulsions may be serious disadvantages in refining these liquid hydrocarbons.

The invention is based upon the observation that if an inhibitor of the kind described in Specification No. 289,347—namely, an aromatic amino or phenolic or nitro compound—is added to the spirit immediately after its recovery from the coal gas the spirit can be stored for a considerable time before removal of the constituents boiling below 80° C. without leading to undue difficulty in the subsequent acid washing.

In carrying out the invention, there is added to the spirit as soon as may be after its recovery from coal gas a quantity, which may be of the order of 0·05%, of an aromatic hydroxy, dihydroxy, or trihydroxy compound or another substance known from Specification No. 289,347 to be suitable for preventing the formation of resins. The spirit is subsequently distilled to remove constituents boiling below 80° C. and then washed with sulphuric acid. The amount of viscous tar formed on washing with sulphuric acid is thereby reduced and the removal of the residual acid by water washing is facilitated.

In some cases such an addition may have the effect of reducing the temperature attained by the liquid hydrocarbons during washing with sulphuric acid, and in such instances it may be advantageous to raise the temperature of the reactants by steam heating or by other suitable means.

The following examples illustrate the results obtainable:

Example 1.—A sample of benzole extracted from coal gas was divided into two portions and to one portion 0·03% of cresol was added, the other portion receiving no addition. After storage for six weeks the low boiling fractions were removed from each portion by distillation, and in each case the residue was stirred with 1% of sulphuric acid of 85% strength and the acid tar formed was run off, In the case of the benzole treated with cresol, the acid tar was fluid. while the benzole was dark brown in colour but transparent in thin layers; there was no solid deposit. In the case of the untreated benzole the acid tar was very viscous and hardened on standing, while the inside of the container was coated with a black, semi-solid scaly deposit which could not be removed by washing with water.

Example 2.—A sample of benzole extracted from coal gas by the oil washing process was divided into two portions. To one portion 0·03% of cresol was added, the other portion receiving no addition. After three days the fractions boiling up to 80°C. were removed from each portion by distillation; during this operation the benzole treated with cresol lost 3·7% and the untreated benzole lost 2·6%.

Each residue was then washed first with 1% of sulphuric acid of 95% strength and then with water to remove residual acid. The aqueous washings constituted a white suspension in the case of the treated benzole and a purple emulsion in the case of the untreated benzole. A second water wash was clear in the case of the treated benzole but formed a fairly coarse emulsion in the case of the untreated benzole.

Mobile Canteen for Lancashire and Cheshire

The constituent companies of the United Kingdom Gas Corporation, Ltd. in the Lancashire and Cheshire area have recently put into commission a mobile canteen, and we show a view which will give some idea of the general layout. Col. W. M. Carr, O.B.E., T.D., Managing Director, in his capacity as Gas Engineering Adviser to the North Western Regional Commissioner, takes the view that the provision of a mobile canteen will greatly ease the work of repair gangs after enemy action. While the first consideration of the canteen is to serve the gas companies of North Cheshire, Rossendale, Ramsbottom, Radcliffe, Runcorn, Northwich, Prescot, Ormskirk, Leyland, and Littleborough, it would also be available to render assistance in other directions.

The canteen has been designed to provide unlimited numbers of nourishing soups and hot drinks, and is capable of providing over 100 substantial hot meals per hour.

The equipment consists of an instantaneous boiling water heater, large double hot plate and removable oven to operate from Calor gas, and similar equipment is installed to work from town's gas when available. In addition there are "Thermot" urns to carry some 20 gallons of hot soups or drinks, and "Thermot" food containers to carry 60 solid meals, all of which can be kept hot for 15 hours.

The United Kingdom Gas Corporation Ltd. are to be congratulated on providing such an excellent canteen, which apart from its great utility value will do much to enhance the prestige of gas throughout the areas of the constituent companies of the Corporation where it will operate.

In Our Report of the meeting of the Midland Association ("JOURNAL" of Nov. 5, p. 205) we referred to the award of Institution Certificates. The recipients of Certificates on that occasion were: K. D. Hooper, West Hagley, First-class Certificate in Higher Grade Gas Engineering (Supply); and B. H. Harrison, Lutterworth, Second-class Certificate in Higher Grade Gas Engineering (Manufacture). We regret that the awards were incorrectly stated in our report.

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Gas Products Prices

The London Market

Nov. 10.

Prices of Coal Tar Products in the London market remain at about the following levels:

Pitch nominal; creosote about 5d.; refined tar 3¾d. to 4d.; pure toluene under the Ministry of Supply Toluene No. 2 Order 2s. 5d.; pure benzole 1s. 10d.; 95/160 solvent naphtha 2s. 5d. to 2s. 8d., and 90/160 pyridine 13s. 6d.; all per gallon naked. All prices are *ex* Makers' Works.

Maximum prices for all grades of naphthalene are now fixed under a direction by the Secretary for Mines issued under the Control of Coal Tar Order, 1941. The direction came into force on Nov. 1, and according to it the price of refined crystal naphthalene is £23 per ton delivered, 2-cwt. bags included.

The Provinces

Nov. 10.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 1s. 10d. (controlled by the Control of Toluene No. 2 Order, July 5, which fixes the maximum price at which this material may be sold). Coal tar, crude naphtha, in bulk, North, 11d. to 1s. Solvent naphtha, naked, North, 1s. 9d. to 1s. 10d. Heavy naphtha, North, 1s. 9d. to 1s. 10d. Creosote, *ex* works, in bulk, North, liquid and salty, 4½d. to 4¾d.; Scotland, 4½d. to 4¾d.; low gravity, 4½d. to 4¾d. Fuel Grade, 4d. to 4¼d. Carbolic acid, 60's, 3s. 7½d. to 3s. 9d. Naphthalene, £15 to £20. Salts, drained, £6 to £6 10s.; whizzed 72°, £7 15s.; 78°, £9 5s. Anthracene prices fixed by Controller. Heavy oil: Unfiltered anthracene oil (min. gr. 1,080), 6d. to 6½d.; filtered heavy oil (min. gr. 1,080), 6½d. to 7d.; heavy anthracene oil gr. less than 1,080, 5¾d. to 6d.

*In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10.

Tar Products in Scotland

GLASGOW, Nov. 8.

A moderate volume of throughput is maintained but new business is rather handicapped by various rules and regulations.

Refined tar is maintained at 4¾d. to 5d. per gallon in the home market and about 4d. per gallon for export, both f.o.r. naked.

Creosote oil is still in great demand with prices approximately as follows: Specification oil, 5¾d. to 6d. per gallon; low gravity, 6½d. to 7d. per gallon; neutral oil, 6d. to 6½d. per gallon; all *ex* Works in bulk.

Cresylic acid is tied up with the new regulations and prices are nominal as under: Pale, 99/100%, 4s. 4d. to 4s. 8d. per gallon; Pale, 97/99%, 4s. to 4s. 3d. per gallon; Dark, 97/99%, 3s. 9d. to 4s. per gallon; all *ex* Works in buyers' packages.

Crude naphtha remains at 6½d. to 7½d. per gallon *ex* Works in bulk, according to quality.

Solvent Naphtha: 90/160 grade is 1s. 8½d. to 1s. 9d. per gallon and 90/190 Heavy Naphtha is 1s. 4½d. to 1s. 5½d. per gallon.

Pyridines are slow to move with 90/160 grade about 14s. per gallon and 90/140 grade about 16s. per gallon.

A Record Price was paid at a Cambridge auction sale last week for the University and Town 7% "B" Consolidated Stock, which was sold at £195. A small lot of £100 original 10% Stock also changed hands at a new record price of £260.

In their Annual Report the Manchester Highways Committee report that progress is still being made with the completion of installation of modified street lighting. Up to March 31 last, modified units had been installed as follows: Gas, 3,931; electric, 4,198. Expenditure on gas lighting for the year was £17,842; on electric lighting £35,595.

Gas Stocks and Shares

Markets were uncertain in tone at the opening last week, and in the absence of any marked change in the war situation business remained quiet until Thursday when a firmer tone developed, and this was accentuated on Friday after the news of the American Loan to Russia and Stalin's speech. British Funds weakened at first, but subsequently recovered any loss and closed at the previous week's levels. South American Government and railway issues attracted considerable attention and several scored substantial gains. Home rails also showed some small improvements, while in the industrial section a number of the leaders advanced. There was an increased demand for South African gold and diamond shares.

The volume of business in the Gas Market was on a slightly reduced scale last week though, with one exception, the few price changes were in an upward direction. Gas Light units failed to maintain their previous week's level and reacted 6d. to 12s. 9d. The majority of the increases occurred among the fixed-interest stocks, including the three Wandsworth issues, while Colombo 7% preference hardened 1s. to par. No changes took place in the Supplementary List. It is interesting to note that Sheffield ordinary stock changed hands on the London exchange at 120, though the quotation at the local exchange is 115 only.

The Directors of Gas Consolidated, Ltd., have declared interim dividends on the "A" and "B" ordinary shares at the rates of 2½% and 2% respectively, the same rates as a year ago.

The following is a complete list of price changes occurring during the week:

OFFICIAL LIST

Associated Gas & Water Ord. ...	13/6—14/6	+-/6d.
Colombo 7 p.c. Pref.	19/—21/-	+1/-
Croydon 5 p.c. Deb.	99—104	+4
Gas Light Units	12/3—13/3	+-/6d.
Uxbridge 5 p.c....	85—90	+2½
Wandsworth 4 p.c.	67—72	+2
,, 5 p.c.	100—105	+3
,, 4 p.c.	80—85	+3

PROVINCIAL EXCHANGES

Sheffield Cons.	114—116	+2

Metro
TRADE MARK.

IN normal circumstances this space is occupied by information concerning the many Coal Tar and Ammonia Chemicals produced by the South Metropolitan Gas Company.

MANY of these products, required in the last war, are wanted more than ever to-day for war purposes.

CERTAIN "Metro" products, however, are available for normal business, such as Medium Soft Coal Tar Pitch, Creosote Oils, Dry Neutral Sulphate of Ammonia, etc., and enquiries for these should be directed to the manufacturers:—

SOUTH METROPOLITAN GAS COMPANY
Products Department:
REGIS HOUSE,
KING WILLIAM STREET,
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Telephone: AVENUE 2755.

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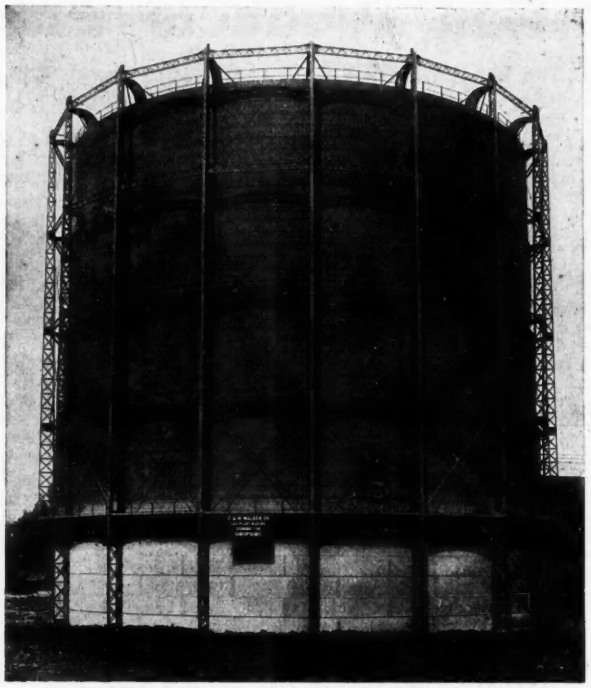

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